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POLISH BONE CAVES

The Bone Caves of Ojcow in Poland. By Prof. Dr. Ferd. Römer. Translated by John Edward Lee, F.G.S., F.S.A., Author of "Isca Silurum," &c., Translator of Keller's "Lake Dwellings," Merk's "Kesslerloch," &c. (London: Longmans, Green, and Co., 1884.)

A RANGE of Oolitic hills, extending, in a north-westerly direction, from Cracow in Galicia to Czenstochau in Russian Poland, a distance of about fifteen German miles, contains the caverns termed, as we learn from the title of the work placed at the head of this article, "The Bone Caves of Ojcow," from a town of that name within the Russian frontier, and about three German miles north of Cracow. These caverns first attracted scientific attention from the fact that their deposits, worked for manure, were found to be rich in bones. Prof. Römer visited them first in 1874, and, having obtained funds from the Royal Prussian Ministry of Instruction, and subsequently from the Royal Academy of Sciences at Berlin, the work of investigation was begun in 1878, and carried on, at intervals, to the summer of 1882.

The facts disclosed, with speculations respecting them, were embodied in a work apparently published early in 1883; and there can be no doubt that, by preparing and publishing the translation now before us, Mr. Lee has added to the obligation under which his previous labours, both as author and translator, have laid English readers. The volume is enriched with twelve admirable plates; a charming Woodburytype frontispiece, exhibiting a magnificent skull of *Ursus spelæus*; and a useful sketch-map of the situation of the bone caves.

The caverns investigated were nine in number; and it must be stated here that, from 1873 to 1879, Count Johann Zawisza of Warsaw had with great care carried on researches in two of them—the Lower and the Upper Caves of Wierszchow, to the former of which he gave the name of *Mammoth Cave*.

The following brief statements respecting the caves themselves must suffice:—

The Cave of Jerzmanowice, about 1 German mile west-south-west from Ojcow, and the largest of the series, is about 230 metres long, tortuous, made up of a series of small grottoes connected by narrow passages, and famous as the richest of the caves in its palæontological and archæological relics.

The Cave of Kozarnia, about 6 of a German mile west-north-west from Ojcow, measured about 59 metres long, had a large entrance, and was rich in remains of mammals and of human industry, of which the greater part had been found, and unfortunately dispersed beyond recovery, before Prof. Römer's researches began.

Near Wierszchow, almost on the frontier of Russian Poland and Galicia, rather more than 1 German mile due south from Ojcow, there are two caverns known as the "Lower" and the "Upper," the former being Count Zawisza's *Mammoth Cave*, as already stated. The Lower Cave is about 19 metres long, 13 metres wide, has two narrow lateral ramifications, and is about 577 metres from the Upper Cave.

The Cave of Zbójceka, about 2 of a German mile south-west from Ojcow, is very low at the entrance, but expands at once into a tolerably high arched space, whence two branches are sent off; that on the right being 129 metres long and 4 wide, while that on the left is but short.

The Cave of Czajowice, a short distance south of that just mentioned, is about 165 metres long. Its stalagmites are more considerable than those of any of the other caverns, attaining in some places a foot in thickness.

Sadlana Cave, about 5 of a German mile north-north-west from Ojcow, and the most northerly of the series, has four entrances, and throws off two lateral branches, which, being blocked up with stones, have not been examined.

Bembel Cave, about 1 German mile south-west from Ojcow, is of but small extent.

Górenice Cave, about 3 German miles west-south-west from Ojcow, the most westerly of the series, and on the frontier of Russian Poland and Galicia, is so very low that a man can rarely stand erect in it, and has two entrances about 40 metres apart.

An oolitic floor appears to be very seldom reached in any of them. They generally contain a deposit of angular pieces of oolite, from an inch in diameter to the size of the fist, mixed with dark brown calcareous clay, and attaining in some cases a thickness of 6 or 8 feet. A few blocks of oolite, some of them containing several cubic feet, are occasionally met with in the deposit, and it is believed that the entire mass was derived from the walls and roof. In most of the caves there are horizontal layers of coarsely crystalline stalagmite, varying from a few inches to upwards of a foot in thickness.

All the caverns have yielded bones, occurring sometimes under the stalagmite and not unfrequently embedded within it, and most of them have entirely lost their gelatinous matter. An entire infra-human skeleton has never been found, nor does there appear to have been anything like even a distant approach to it; indeed, except in one solitary case, the two rami of every lower jaw were separated.

Few, probably none, of the caves have received an exhaustive scientific exploration, and it is stated of most of them that they have only been very partially examined. Unfortunately, as we learn from Prof. Römer, it cannot be always positively stated from which bed the specimens were taken; "but," he adds, "the case is the same with most of the caves which have been excavated in Germany." We agree with him that this could only have been avoided by carrying the work on quite slowly and with great precaution under the continued superintendence of a scientific manager, and we venture to add that such a price would have been well worth paying. It must be stated, however, that Count Zawisza, having mainly devoted himself to one of the caves, in which the daylight was available for the whole work, and on which he appears to have spent at least portions of seven years, was able to note the exact situation of each specimen.

The caverns yielded remains of fifty species of mammals, twelve of birds, and two of reptiles. All the birds belong to species still inhabiting the British Isles as well as continental Europe, with the possible exception of very scanty relics of the genera *Emberiza* and *Hirundo*, and may be dismissed with the remark that they are

usually represented by a single specimen only. The reptile remains consist of one humerus of the common frog, and numerous bones of toads, the species being undetermined.

The mammalian remains include those of thirty-two species familiar to explorers of British caverns. The remainder belong to twelve species forming part of the existing British fauna, including the domestic cat; three recent European, but not British, species, and three undetermined species of the genera *Capra*, *Ovis*, and *Sus*. On the other hand, certain forms for which some British caves have become famous are totally unrepresented in the Ojcow list, such as *Ursus priscus*, *Gulo luscus*, *Machairodus latidens*, *Cervus megaceros*, *Ovibos moschatus*, *Bos longifrons*, *Hippopotamus major*, *Elephas antiquus*, *Lagomys spelæus*, and *Castor fiber*. Not a single species appears to be represented by remains found in all the caves, and only one—the cave bear—by those found in eight of them. Twenty-two of the species—nearly one-half of the entire number—are restricted to one, not the same, cave.

The remains of the cave bear were not only more widely distributed in the caves, but were far more numerous than those of any of the other mammals, especially in the lower levels of the deposit. The Cave of Jerzmanowice alone is believed to have yielded fully 4000 canine teeth of this species, representing, of course, 1000 individuals at least. The animals were of all ages, from the sucking cub to a patriarch whose skull measured about 19·5 inches long and 12 inches broad across the zygomatic arch. The brown bear appears to have been represented by remains of one individual only, found in the *Mammoth Cave*, which also yielded bones and teeth of the great pachyderm from which it was named. Relics of this species were disinterred in four other of the caves; and it was concluded from the occurrence of numerous ivory tools that mammoths must have existed in considerable numbers. The woolly rhinoceros was found only in two caverns, and its remains do not appear to have been abundant. The cave hyæna was apparently very little, if at all, more prevalent, as it was represented in no more than three of the caves. Next to the cave bear, no animal was more generally distributed than the reindeer, whose relics occurred in six of the caverns—a distinction also reached by the common fox. Count Zawisza's researches have led him to the conclusion that the distinction between an older mammoth period and a more recent reindeer period, as made out from the researches in France, will not apply to these Polish caves.

The traces of man were numerous and varied, consisting of parts of his skeleton, hearths, and implements of various kinds. His bones were found in seven of the caverns, and several skulls were met with in five of them; but, unfortunately, the remains of the animals lying with them were not in all cases accurately noted. Some of these relics were near the surface, others lay deeper, and some were covered with a thick bed of stalagmite. A "skeleton," pressed against the side of the Czajowice Cave, was more than a metre below the surface; and in the Górenice Cave several skulls were also found close to the sides. From a report by Prof. Virchow, to whom the skulls have been submitted, it appears that some of them are dolicocephalic, others mesocephalic; that there is

some doubt whether they are of the same age as the deposit containing the implements of the most ancient inhabitants; and that there is no peculiarity indicating any very high antiquity, nor any essential difference in the forms of the skulls from those of the present inhabitants of Poland.

The hearths, which occurred in six of the caves, were in some instances one above another with a thick mass of deposit between them; and some of them contained bones of ox, reindeer, mammoth, boar, and cave bear mixed together, broken artificially, and blackened by fire.

Flint implements and "cores" appear to have been found in all the caves, and Count Zawisza, in his *Mammoth Cave* alone, disinterred about 2000. The raw material was no doubt obtained from the Upper Oolitic Limestone of the district, in which flint nodules abound. The author speaks of the tools as being "Palæolithic" in all cases, but this must probably be understood as a synonym for "unpolished," and not taken necessarily in a chronological sense in all cases. It must be stated, however, that one flint tool was found with a vertebra of the cave bear in the same bed of firm crystalline stalagmite.

Of other stone tools, two axes were met with, one in each of the Wierszchow Caves: one, made of serpentine, was perforated to receive a helve; the other was of diorite. They were the only polished stone tools the caverns yielded. Several roundish cuboidal stones, the size of a man's fist, and believed to be "corn-crushers," were found. One of these also was of diorite. There were also "polishing stones," or "rubbers," some of fine-grained sandstone and others of black clay slate, apparently used for finishing bone tools.

Two glass beads, with inlaid threads of clear-coloured glass, were found in the Kozarnia Cave; and from their great depth in the deposit a considerable antiquity is claimed for them. It is believed they must have been of foreign origin. The Zbójcka Cave yielded three amber beads, rather flat, not quite symmetrical, but smoothed.

Of articles made of bone, there were rods artificially sharpened at one end, and, in some cases, perforated at the other; a knife made of a lower tusk of boar; a canine tooth of bear artificially perforated at the lower end, a stout needle having a large eye; straight hollow bones of birds, cut transversely at one end and broken at the other; a straight rod of ivory sharpened at both ends, and as "round as if turned in a lathe"; perforated teeth, including one of boar (ground flat on one side), wolf, fox, and elk; four imperfectly rounded and smoothed beads; and seven ivory rods, compressed and lancet-shaped, the largest a foot long and 1·5 inch in greatest breadth. These rods were all found in one and the same bed, which contained charcoal, rough flint tools, and bones of wolf, polar fox, and reindeer. Long bones, broken artificially lengthways, were found in great numbers, as well as pieces of antlers having cut surfaces.

One fragment of the shell of *Cypræa tigris*, an Indian Ocean species, presented itself. It is supposed to have been obtained by the Cave-men by barter.

Pottery occurred in nearly every cave and at all levels. The lowest, roughly hand-made, slightly burnt, and unglazed, included part of a pot-like vessel, so porous as to render it improbable that it could have been intended to contain any liquid. Among specimens of later date, and

better, though still rough, workmanship, was a small pipkin-like vessel, with its handle perfect. Some of these pieces were roughly and simply ornamented. Specimens from the uppermost level were clearly more modern.

Three of the caves yielded dark gray or black spindle-whorls of burnt clay, of fairly good workmanship.

The metal objects included a bronze fibula and ring, a silver coin supposed to be about the year 140, and iron arrow- and lance-heads of mediæval form.

We are grateful for this contribution to the palæontology and anthropology of Europe, and are encouraged by it to entertain the hope that Prof. Römer may be enabled to make arrangements for the *complete and systematic* exploration of at least one of the Ojcow caves at present untouched; and that sufficient means may be at his disposal to place the work under continued scientific superintendence.

OUR BOOK SHELF

Poisons: their Effects and Detection. By Alex. Wynter Blyth, M.R.C.S. (London: Charles Griffin and Co., 1884.)

THIS elaborate volume forms a part of the second edition of the author's treatise on "Practical Chemistry," which has been wisely split up into two volumes, one on "Foods," the other on "Poisons." Mr. Blyth's experience as a health-officer and public analyst guarantees that his conclusions are largely based on actual practice as a toxicologist; and the book will be found to abound in records of his own experiences.

But Mr. Blyth is also an accomplished linguist, and his book bears ample evidence of extensive reading, and a wide acquaintance with the European literature of toxicology. Almost every page teems with references to original memoirs in the French, German, and Italian languages; and this circumstance alone would render it an indispensable work of reference to be placed in the library of every toxicologist. But "Poisons" has other and distinguishing merits.

The general reader will find the introductory chapter on the old poison-lore of great interest, and replete with many but little known facts and fables relative to the history of poisons and their secret administration. Following on this we find a succinct account of the growth and development of the modern methods of chemically detecting poisons, at the end of which nearly three pages are devoted to a bibliography of the chief works on toxicology of the present century, in which we miss any reference to one of the most complete treatises on poisons extant—that forming the bulk of the seventeenth volume of Ziemssen's "Cyclopædia of Medicine."

In giving a scientific definition of a poison, Mr. Blyth somewhat enigmatically remarks that "The definition of a poison, in a scientific sense, should be broad enough to comprehend not only the human race, but the dual world of life, both animal and vegetable." He finally defines a poison thus:—"A substance of definite chemical composition, whether mineral or organic, may be called a poison, if it is capable of being taken into any living organisms, and causes, by its own inherent chemical nature, impairment or destruction of function." He excludes the bacteroid bodies met with in certain diseases, but apparently ignores the views of those observers who are of opinion that these organisms form or excrete true poisons of definite chemical constitutions.

A novelty in the work is the devotion of a section to what are termed "life-tests," i.e. the identification of poisons by their effects on living animals. This, and the elaborate instructions given on the authority of various writers, as to the methods to be adopted for separating and identi-

fying the various poisons, will be found invaluable to the analyst; and his only difficulty will be the choice of one out of the almost innumerable methods given for the separation of a single poison, say arsenic or opium.

THOMAS STEVENSON

Informe Oficial de la Comision cientifica agregada al estado mayor general de la Expedicion al Rio Negro (Patagonia) realizada en los meses de Abril, Mayo, y Junio de 1879, bajo las ordenes del General D. Julio A. Roca. Entrega I. Zoologia (con 4 laminas). Part 1. 4to, 168 pp. (Buenos Ayres, 1881.)

IN 1879 the Government of the Argentine Republic despatched an expedition to the southern confines of their territory for the suppression of the hordes of Indians that had for many years previously rendered the district of the Rio Negro unsafe to travellers and to settlers. Under the command of General Roca these marauding savages were successfully driven off to the south of the Rio Negro, and a new frontier, which they are not allowed to cross northwards, was established. General Roca (whose excellent example on this occasion it would be well if some of the Governments of Europe would follow) having invited a commission of scientific men to accompany his expedition, Dr. P. G. Lorentz and Mr. G. Niederlein were sent with him as botanical collectors, and Herr Schulz, Inspector of the Zoological Museum of Cordoba, as zoologist. The results of the last mentioned naturalist's labours are contained in the volume now before us, which has been prepared by Dr. A. Doering, with the assistance of Dr. Berg, Dr. Holmberg, and D. Enrique Lynch Arribalzaga, and is highly creditable to the youthful Academy of Natural Sciences of Cordoba, to whom, it would appear, the task of working out the scientific collections was intrusted.

Dr. Doering commences his labours by a chapter of general observations upon the fauna of the newly occupied territory, which he divides into four "zoogeographic zones"—(1) the region of the Southern Pampas; (2) the river-region of Northern Patagonia; (3) the central mountain-region; and (4) the eastern slopes of the Cordillera. The two last regions being very little known and not having been traversed by the expedition, are not discussed in the present essay, but the two former are subdivided into minor districts, and the principal zoological characters of each of their subdivisions are pointed out. Lists are also given of the principal mammals, birds, amphibians, and land-mollusks that are chiefly peculiar to the different districts.

Dr. Doering's instructive "zoogeographical" essay is followed by the systematic portion of the volume, in which the vertebrates and land-shells are treated of by the same naturalist, while his colleagues, Dr. Berg and Dr. Lynch Arribalzaga, have worked out the insects, and Dr. Holmberg the arachnidans. We have thus before us an excellent basis for a fauna of this hitherto little-known portion of the great Neotropical Region, which does credit alike to the Government of the Republic which instituted the investigation, and to the Academy of Natural Sciences of Cordoba, under whose auspices the work has been elaborated.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

Instinct

IN his letter under this heading in last week's NATURE (p. 428), Mr. Romanes says that I now admit that the actions of